

ABSTRACT OF THE DISCLOSURE

A constrained non-linear approximator for empirical process control is disclosed. The approximator constrains the behavior of the derivative of a subject empirical model without adversely affecting the ability of the model to represent generic non-linear relationships. There are three stages to developing the constrained non-linear approximator. The first stage is the specification of the general shape of the gain trajectory or base non-linear function which is specified graphically, algebraically or generically and is used as the basis for transfer functions used in the second stage. The second stage of the invention is the interconnection of the transfer functions to allow non-linear approximation. The final stage of the invention is the constrained optimization of the model coefficients such that the general shape of the input/output mappings (and their corresponding derivatives) are conserved.